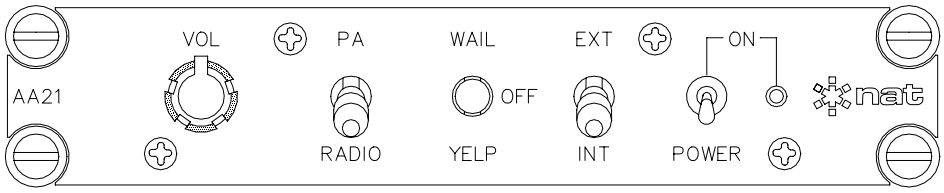
SM34

AA21-400
Cabin PA System



INSTALLATION AND OPERATION MANUAL

REV. 4.00 November 10, 2003

Northern Airborne Technology Ltd.
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V1Y 4N7

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Periodically NAT will release manual amendments. In order to maintain the most accurate and up to date manual these amendments should be carried out immediately upon receipt and recorded on the following amendment record.

AMENDMENT RECORD

Amendment Number	Amendment Date	Section(s) Changed	Date Entered	Entered By
1	Jan 18\05	2		**Performed at factory**
2	May 24\06	Pg iii, 1		**Performed at factory**
3	Apr 21\09	2		**Performed at factory**

Insert any Amendment Instruction sheets after this page.

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INSTALL_OPS
MANUAL AMENDMENT

Manual: SM34 (AA21-400)	**Amendment #: 3**
Document # SM34\Install_Ops\809-0003	**Amendment Date:** Apr 21, 2009

The purpose of this amendment is to add the latest drawings to the manual.

Amendment Instructions:

1

Remove Pages	Replace With Pages
2-5 Rev 4.00 Amendment 1	2-5 Rev 4.00 Amendment #3

2

Remove Drawings (Section 2)	Replace or add Drawings (Section 2)
AA21\400\403-0 Rev 1.00	AA21\400\403-0 Rev 1.01
AA21\400\905-0 Rev 1.00	AA21\400\905-0 Rev 1.10

3 Update the Amendment Record sheet at the front of the manual.

4 Insert this page into the manual after the Amendment Record sheet (page ii).

Manual Amendment ends after the following amended pages

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INSTALL_OPS
MANUAL AMENDMENT

Manual: SM34 (AA21-400)	**Amendment #: 2**
Document # SM34\Install_Ops\809-0002	**Amendment Date:** May 24, 2006

The purpose of this amendment is to correct the numbering sequence and add section 1.5 Accessories Required But Not Supplied to the table of contents.

Amendment Instructions:

1

Remove Pages	Replace With Pages
Title Section Page iii Rev 4.00	Title Section Page iii Rev 4.00 Amendment #2
1-3 and 1-4 Rev 4.00	1-3 and 1-4 Rev 4.00 Amendment #2

2 Update the Amendment Record sheet at the front of the manual.

3 Insert this page into the manual after the Amendment Record sheet (page ii).

Manual Amendment ends after the following amended pages

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INSTALL_OPS
MANUAL AMENDMENT

Manual: SM34 (AA21-400)	**Amendment #: 1**
Document # SM34\Install_Ops\809-0001	**Amendment Date:** Jan 18, 2005

The purpose of this amendment is to add the Environmental Qualification Form (521-0) to section 2.5 and to update the section 2.3.4 Cable Wiring statement paragraph 1.

Amendment Instructions:

1

Remove Pages	Replace With Pages
2-1, 2-2 and 2-5 Rev 4.00	2-1, 2-2 and 2-5 Rev 4.00 Amendment #1

2

Remove Drawings/Documents (Section 2)	Replace or add Drawings/Documents (Section 2)
-	AA21\400\521-0 Rev 1.20

Note: Ensure that all drawings are inserted in the order shown on the latest drawing lists.

3 Update the Amendment Record sheet at the front of the manual.

4 Insert this page into the manual after the Amendment Record sheet (page ii).

Manual Amendment ends after the following amended pages

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Section 1.0 Description

1.1 Introduction

This manual contains information on the AA21-400 Cabin PA System.

Information in this section consists of purpose of equipment, features and specifications.

1.2 Purpose of Equipment

The AA21-400 Cabin PA control unit is designed to provide centralized control for an aircraft's internal and external PA systems. The design is contained in one panel-mounted unit, with an illuminated faceplate. All audio and keylines are interfaced to existing aircraft audio systems. Front panel switches provide selection of the various operational modes of the AA21 and a potentiometer provides output volume control.

1.3 Features

The AA21-400 provides selection and control of internal and/or external PA system(s) installed in an aircraft. The integrated 25 W speaker driver circuit is designed to drive one 8 Ω speaker arrangement for internal paging. The AA21-400 also provides a low-level audio signal output that drives the input on a remote mounted power amplifier. The output is designed to drive the NAT PA110/220 or PA250/700 series amplifiers. The AA21-400 provides generation of wail and yelp siren audio on the low level output when selected on the front panel.

A '+3 dB' function allows the output level of the system to be varied by 3 dB. When the input control line is grounded, the output is reduced by approximately 3 dB, and removing the ground returns the system to full output.

Thermal protection is designed into the intermediate and final stage amplifiers to protect the unit during very hot or extended high power operating conditions.

Four front panel switches provide selection of the various operational modes of the AA21-400 as described in Section 3 of this manual (Operation).

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1.4 Specifications

1.4.1 Electrical Specifications

Power Supply — Linear DC (with reverse & over voltage protection):

Normal: +27.5 Vdc nominal.
+22.0 Vdc minimum.
+30.3 Vdc maximum.
+18.0 Vdc emergency.

Input Current: 2.3 A max. full speaker power (35 W) @ +27.5 Vdc.
2.9 A max (35 W) with 0.40 A load on Switched Power Output.
0.40 A idle @ +27.5 Vdc.

Backlighting: 150 mA max @ +27.5 Vdc.

Input Signals

Microphone: 150 Ohm amplified dynamic.
250 mVrms rated input level.

ALC: Automatic level controlled for maximum intelligibility without distortion starts @ 130 mVrms.

Impedance: 130 Ohm ± 10%.

Music: Only one of Radio (Receive) or CD may be enabled at a time.

Radio (Receive): 2.5 Vrms into 1k Ω ± 10%.

CD: 1.0 Vrms into 11k Ω ± 10%.

PA key: Active low. Max. current source 15 mA.

+3dB key: Active open, isolated through optical relay. Max. current source 13 mA. Reduces all audio, except sidetone, by 3 dB when grounded. The output will be reduced 2 to 3 dB if operating above 25 W on speaker output, or above 6.5 Vrms on PA output.

Input to Input Crosstalk: ≤ -40 dB from rated output.

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Output Signals

Speaker: Impedance and short circuit protected.

≤ 10% THD: 20 W single tone into 8 Ω @ 50% duty cycle. Continuous.
20 W voice/music into 8 Ω @ 100% duty cycle. Continuous.

Note: Distortion is ≤ 3% THD at 10% of continuous output power rating.

> 10% THD: 35 W max. into 8 Ω with 2.5 Vrms into Radio (Receive) input. Non-continuous (short term).

Audio bandwidth: Mic input: ≤ 3 dB roll-off from 350 Hz to 3 kHz
Radio (Receive)/CD input: ≤ 3 dB roll-off from 350 Hz to 6 kHz

PA: Selectable by internal jumper for either
PA110/220 (6.5 Vrms ± 10% into 600 Ω) or
PA250/700 (0.5 Vrms ± 10% into 600 Ω) for rated output.

Distortion: ≤3% THD at rated output.

Audio bandwidth: Mic input: ≤ 3 dB roll-off from 350 Hz to 3 kHz
Radio (Receive)/CD input: ≤ 3 dB roll-off from 350 Hz to 6 kHz

Siren: Only available on PA output (735 to 1620 Hz). Yelp and wail modes with adjustable rates. Siren level control provided for yelp/wail by one internal trimpot.

Sidetone: Adjustable 0-100 mW into 600 Ω with ≤ 10% THD
Audio bandwidth: ≤ 3 dB roll-off from 350 Hz to 3 kHz

Input to Output Crosstalk: ≤ -50 dB from rated output.

Audio Noise Level (without signal): ≤ -50 dB from rated output.

Switched Power: +27.5 Vdc @ 0.40 Amps max. Over current protected.

Temperature Sensor: The unit contains a temperature sensor IC which when triggered reduces the input signals by 3 dB. The IC threshold is set to approximately 130° C.

Annunciator: Power On (illuminates green when active)

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1.4.2 Physical Specifications

Height	1.11 ± 0.03" (28.1 ± 0.8 mm)
Depth	6.53 ± 0.03" (165.9 ± 0.8 mm) behind panel (including connector).
Width	4.96 ± 0.03" (126.0 ± 0.8 mm) behind panel. 5.75 ± 0.03" (146.1 ± 0.8 mm) in front of panel.
Weight	1.40 ± 0.07 lbs. (0.64 ± 0.03 kg)
Mounting	Std. Dzus Mounting (4 fasteners)
Faceplate	Engraved acrylic edge lit panel, with 28 Vdc backlighting.
Material/Finish	Chassis & cover: 5052-H32 brushed aluminum with chromate conversion finish.
Heat sinks:	de-burred 6063-T6 aluminum with chromate conversion finish.
Connector	Male filtered 25 pin D-subminiature with Positronics V5 locking tabs.

1.4.3 Environmental Specifications

Operating Temp	-30° C to +55° C
Survival Temp	-55° C to +85° C
Humidity	> 95%
Altitude	25,000 ft.
DO-160D Env. Cat.	B4-BAB[(SBM)(UF)]XXXXXXZBABB[TTX]MXXXX
TSO Compliance	TSO-C50c, RTCA DO170 Class II (Applicable to units Serial # 1200 and up)

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1.5 Accessories Required But Not Supplied

Installation kit p/n AA21-400-IKC (crimp) or AA21-400-IKS (solder) is required to complete the installation. They consist of the following:

AA21-400-IKC (crimp) NAT Part #:D25SV-IKC

Quantity	Description	NAT Part #
1	D-min 25 Socket housing	20-21-025
25	MS Crimp Socket	20-26-901
1	25 Pin JVL Hood/Locklever	20-29-250

AA21-400-IKS (solder) NAT Part #:D25SV-IKS

Quantity	Description	NAT Part #
1	D-min 25 Socket Solder Cup	20-20-025
1	25 pin JVL Hood/Locklever	20-29-250

End of section 1.0

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Section 2.0 Installation

2.1 Introduction

Information in this section consists of: unpacking and inspection procedures, installation procedures, post-installation checks, and installation drawings.

2.2 Unpacking and Inspection

Unpack the equipment carefully and locate the warranty card. Inspect the unit visually for damage due to shipping and report all such claims immediately to the carrier involved. Note that each unit should have the following:

- AA21-400 Cabin PA System
- Warranty Card
- Operator's Manual
- Release certification

Verify that all items are present before proceeding and report any shortage immediately to your supplier.

Complete the warranty card information and send it to NAT when the installation is complete. If you fail to complete the warranty card, the warranty will be activated on date of shipment from NAT.

2.3 Installation Procedures

2.3.1 Note to Installers

The AA21-400 is intended for use as a cockpit-mounted control for an internal or external aircraft PA system, where such a system is not installed to fulfill the airworthiness requirements for the aircraft or an operating rule.

The AA21-400 is certified to RTCA DO-160D Section 20 (RF Susceptibility) Category T, for installation in a well-protected electromagnetic environment such as an enclosed avionics bay in an all-metallic aircraft. The equipment shall therefore not be installed to satisfy the requirement of FAR 25.1423 for a Public Address system.

2.3.2 Warnings

Never ground any audio output line from the AA21-400 or permanent damage may result. Always check ADF and compass calibration after installing external speakers or PA amplifiers. Significant single cycle errors may be caused by the concentration of steel and magnetic material. **Do not** bundle any lines from these units with transmitter coax lines. **Do not** bundle any lines from this unit with 400 Hz synchro wiring, or AC power lines.

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2.3.3 Cautions

Use shielded cable exactly as shown and **ground as indicated**. All audio installations can be severely degraded by incorrect wiring and shielding. Unusual buzzes, hums or other background audio are symptomatic of multiple grounds, or noisy external systems such as blowers or pumps sharing wiring with the audio system. Never operate any of these units below their 8 Ω rated impedance.

2.3.4 Cabling and Wiring

All unshielded wire shall be selected in accordance with AC43.13-1B Change 1, Paragraphs 11-76 through 11-78. Wire types should be to MIL-W-22759 as specified in AC43.13-1B Change 1, Paragraphs 11-85, 11-86, and listed in Table 11-11. For shielded wire applications, use Tefzel MIL-C-27500 shielded wire with solder sleeves (for shield terminations) to make the most compact and easily terminated interconnect. Follow the wiring diagrams in Section 2.6 as required.

Allow 3 inches from the end of the wire to the shield termination to allow the hood to be easily installed. Note that the hood is a 'clamshell' hood, and is installed after the wiring is complete.

All wiring should be at least 22 AWG, except power and ground lines, which should be at least 20 AWG. Ensure that all ground connections are clean and well secured. To prevent system failure or inadequate equipment protection, power must be supplied from a separate breaker or fuse and not connected to any other source.

2.3.5 Post-Installation Checks

2.3.5.1 Voltage/resistance checks

Do not attach the AA21-400 until the following conditions are met.

Check the following:

a) P101 pins **<1> <2>** and **<3>** for +28 Vdc relative to ground.

b) P101 pins **<14>, <15> and <16>** for continuity to ground (below 0.5 Ω).

c) P101 pins **<18>,** and **<22>** (with switches open) for infinite resistance to ground (> 10 MΩ).

d) P101 pin **<5>** to pin **<7>** for 4 – 6 Ω (typical).

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2.3.5.2 Power On checks

WARNING

The AA21-400 is a high power device, capable of producing tones at very high volume levels. Ensure that all personnel are well clear of the aircraft prior to keying the siren or PA. Failure to adhere to this warning could cause injury to personnel and/or damage to equipment. DO NOT conduct the following tests inside an enclosed area (i.e. a hangar.)

a) Install the Cabin PA system and remote amplifier(s) and speaker(s) as applicable, and then power up the ship's systems. Turn on all of the radios and other accessories required for this system. Check that the **POWER ON** LED on the AA21-400 illuminates when the power switch is selected to **ON**.

b) From the front panel switches, select PA and EXT. Key the siren using the front panel switch and remote Siren key as described in Section 3.4.4.1. The siren should sound on the external PA speakers, and the level should be at maximum volume (the VOL control fully cw). If the siren rate needs adjustment use the corresponding trimpot on the top of the AA21-400. Refer to section 2.3.6.1 for details.

c) Configure the audio system as required to allow connection of the pilot's mic to the PA and key the cyclic switch for transmit. The mic audio should be heard on the PA speakers. Adjust the front panel level control for the desired volume. Set the front panel switch to RADIO, and check for correct radio operation and note what volume settings will produce a suitable external paging level. USE CARE TO AVOID FEEDBACK INTO THE MICROPHONE!

Note: A faint audio signal may be heard at the speaker (even when the system is not paging) due to the very high gain of this system and stray coupling in the wiring. It should not be audible in flight.

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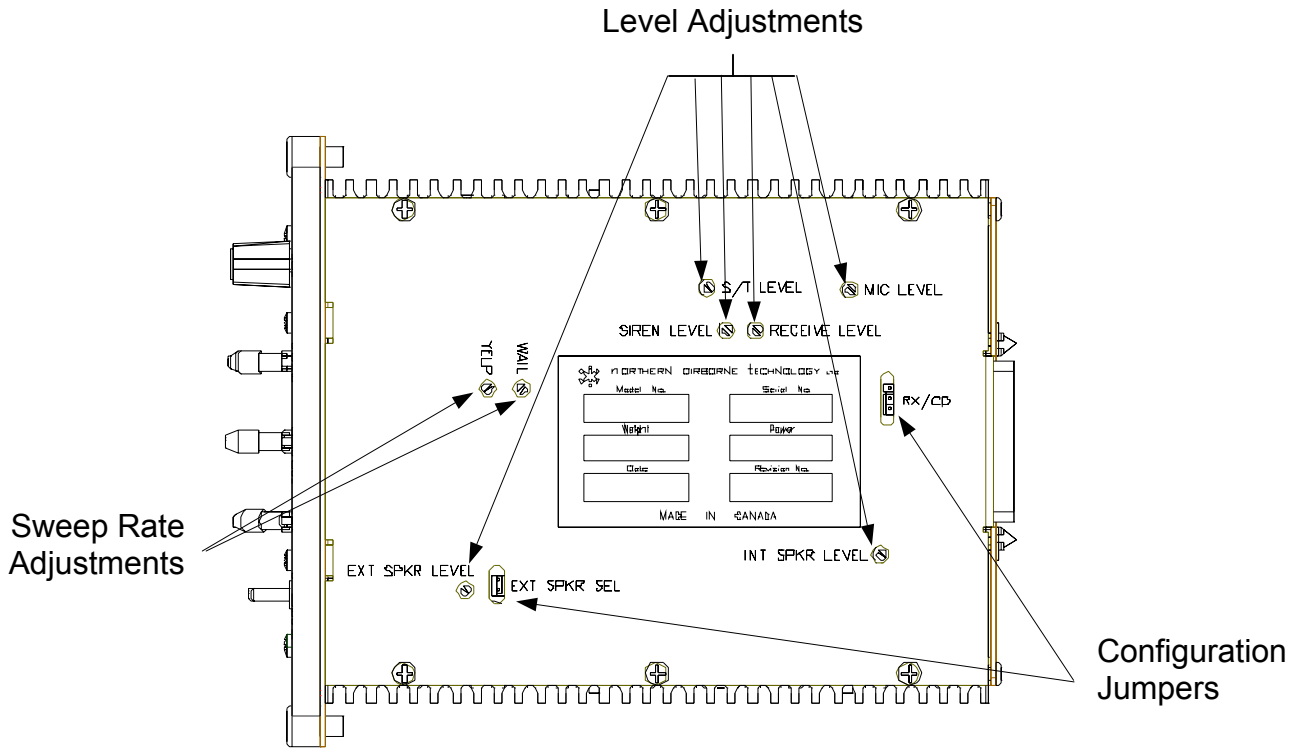
2.3.6 Adjustments

The unit ships from the factory with all internal adjustments set to the normal test levels. Once installed in the aircraft, it may be desirable to change some of these settings to best suit the local operating environment. The internal adjustments are accessible through holes located on the top of the unit.



2.3.6.1 Sweep Rate

The sweep rates for the wail and yelp modes of the siren are adjustable using the appropriately marked pots. The yelp rate is adjustable from 48 cycles/min to 300 cycles/min, and the wail rate is adjustable from 5 cycles/min to 200 cycles/min. Rotating a pot cw will increase the sweep rate, and ccw will decrease it.

2.3.6.2 Level Adjustments

The sidetone, mic, siren, receive, and internal speaker levels are all adjustable by rotating the appropriate pots cw to increase the level, and ccw to decrease it. The external speaker level is adjustable by rotating the appropriate pot cw to decrease the level, and ccw to increase it.

The range adjustments for the potentiometers are given below:

External speaker level:	(60dB dynamic range)
Internal speaker level:	(90dB dynamic range)
S/T level:	(100dB dynamic range)

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Mic level: (60dB dynamic range)

Receive level: (70dB dynamic range)

Siren level: (70dB dynamic range)

2.3.6.3 Configuration Jumpers

The configuration options for the AA21-400 can be selected by installing jumpers as shown below:

RX/CD: Pins 1-2 : Radio (Receive) input enabled, CD input disabled
Pins 2-3 : CD input enabled, Radio (Receive) input disabled

EXT SPKR LEVEL : Installed : 500 mVrms output level
Not installed : 6.5 Vrms output level

2.4 Continued Airworthiness

Maintenance of the AA21-400 is 'on condition' only. Periodic maintenance of this product is not required.

2.5 Installation Drawings

DRAWING	REV.	DESCRIPTION	TYPE	SERIAL #
AA21\400\403-0	1.01	AA21-400 Cabin PA System	Interconnect	All
AA21\400\405-0	1.00	AA21-400 Cabin PA System	Connector Map	All
AA21\400\521-0	1.20	AA21-400 Cabin PA System	Environmental Qual Form	1200 and up
AA21\400\905-0	1.10	AA21-400 Cabin PA System	Faceplate	All
AA21\400\922-0	1.00	AA21-400 Cabin PA System	Mech. Installation	1015 – 1199
AA21\400\922-0	1.11	AA21-400 Cabin PA System	Mech. Installation	1200 and up

Section 2.0 ends after these Drawings

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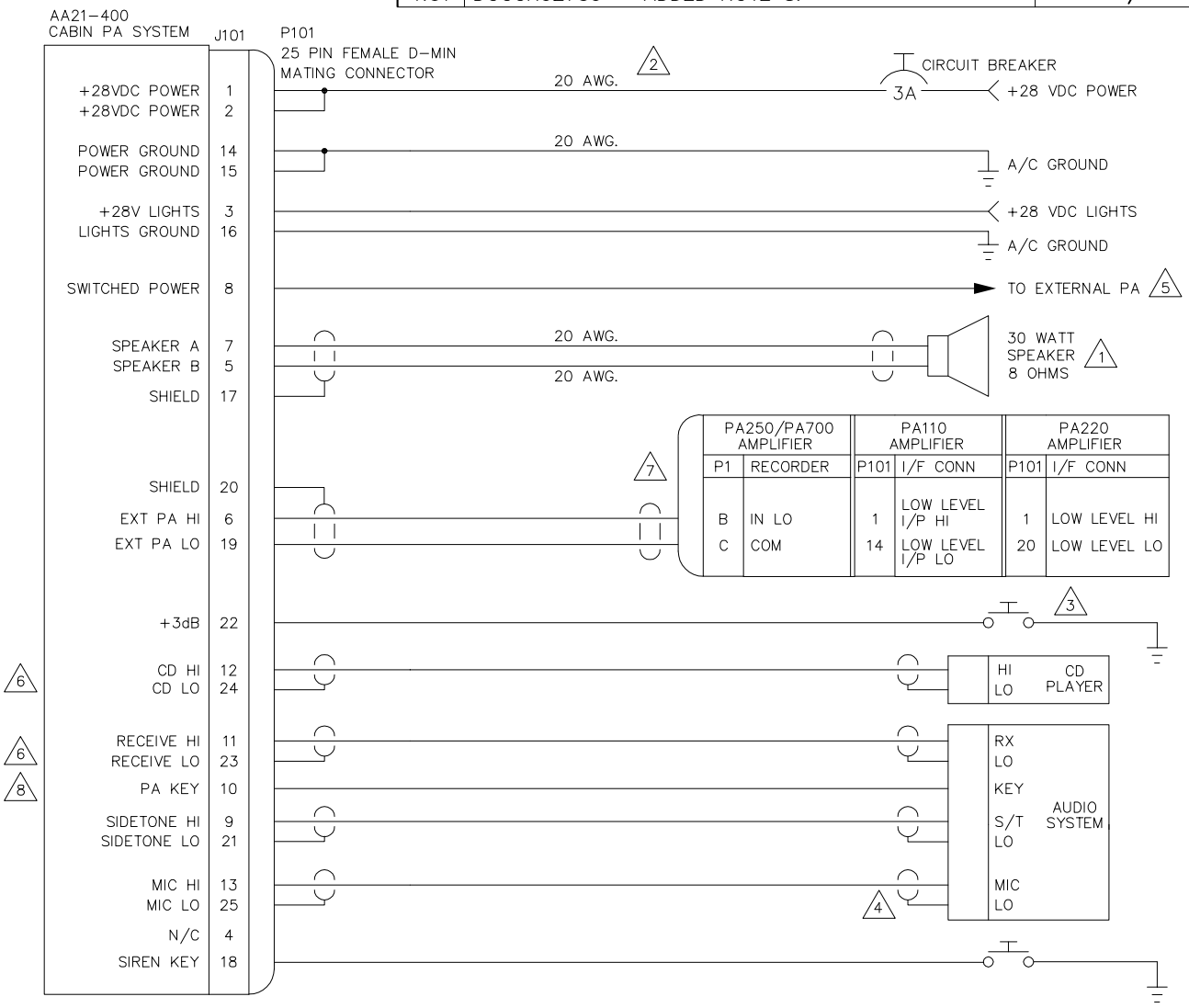
REVISIONS			
REV	DESCRIPTION	DATE	BY
1.01	DOCCR02739 – ADDED NOTE 8.	FEB 5/09	TAT



NOTES:

1. EQUIVALENT SERIES/PARALLEL SPEAKERS MAY BE USED.
2. ALL WIRES SHOULD BE 22 AWG UNLESS OTHERWISE SPECIFIED. ALL UNSHIELDED WIRE SHALL BE SELECTED IN ACCORDANCE WITH AC43.13–1B CHANGE 1, PARAGRAPHS 11–76 THROUGH 11–78. WIRE TYPES SHOULD BE TO MIL–W–22759 AS SPECIFIED IN AC43.13–1B CHANGE 1, PARAGRAPHS 11–85, 11–86 AND LISTED IN TABLE 11–11. ALL SHIELDED WIRE/CABLE SHOULD BE IN ACCORDANCE WITH MIL–C–27500.
3. GROUND TO REDUCE OUTPUT BY 3dB.
4. MIC LO MUST BE GROUNDED AT AUDIO PANEL.
5. +28VDC @ 400mA MAX.
6. JUMPER CONFIGURED. ONLY RECEIVE OR CD MAY BE USED AT ONE TIME.
7. REFER TO AA21 INSTALLATION AND OPERATION MANUAL FOR CORRESPONDING AA21 JUMPER SETTING.
8. WHEN CONNECTED TO AN AUDIO SYSTEM WITHOUT A PA KEY OUTPUT, CONNECT PIN 10 TO GROUND. WHEN CONNECTED TO AN AUDIO SYSTEM WITH A PA KEY OUTPUT, CONNECT AS SHOWN

DEFINITIONS:

N/C:
NO CONNECTION. THE PIN IS NOT CONNECTED TO ANYTHING INTERNALLY, AND THEREFORE SHALL HAVE NO CONNECTION EXTERNALLY.

RESERVED:
MAY BE CONNECTED AND USED IN THE FUTURE. THE CIRCUITRY MAY BE PRESENT OR ADDED TO ACTIVATE THE FUNCTION. THE PIN MAY BE USED FOR TEST PURPOSES. THERE IS NO EXTERNAL CONNECTION.

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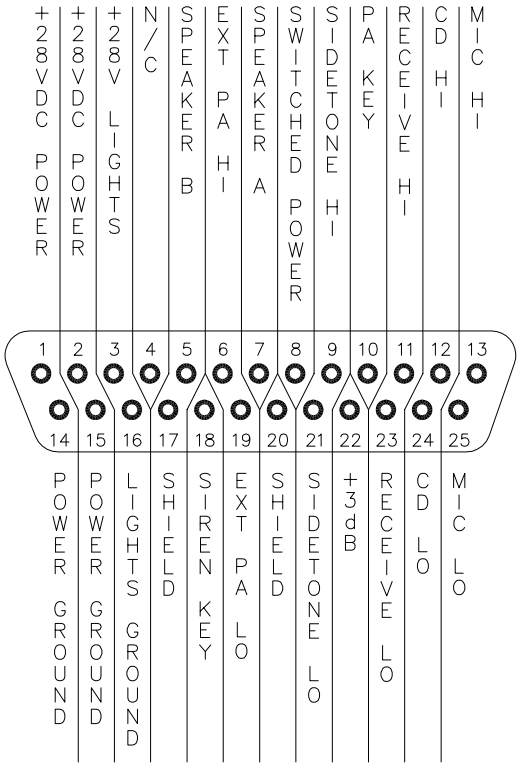
DESIGNED	RL	nat NORTHERN AIRBORNE TECHNOLOGY LTD.				
DRAWN	SRK					
DATE	NOV 9/99	TITLE CABIN PA SYSTEM				
CHECKED	NAT 255					
APPROVED	NAT 131	SIZE A	CAGE CODE 3AB01	PART NO. AA21–400	REV. 1.01	SHEET 1/1
FILE 403–0.DWG		DWG. TYPE INTERCONNECT		DWG. NO. AA21\400\403–0		

P101

25 PIN FEMALE D-MIN
MATING CONNECTOR



VIEW IS FROM REAR OF AIRFRAME CONNECTOR

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DESIGNED	MAD/SRK	NORTHERN AIRBORNE TECHNOLOGY LTD.				
DRAWN	SRK					
DATE	SEP 10/99	TITLE: CABIN PA SYSTEM				
CHECKED	NAT 104 / NAT 214					
APPROVED	NAT 107	SIZE: A	CAGE CODE: 3AB01	PART NO.: AA21-400	REV.: 1.00	SHEET: 1/1
FILE: 405-0100.DWG		DWG. TYPE: CONNECTOR MAP		DWG. NO.: AA21\400\405-0		

ENVIRONMENTAL QUALIFICATION FORM

Description: **Cabin PA System** Document #: **AA21\400\521-0**

NAT Part #: **AA21-4xx** TSO #: **C50c**

Manufacturer's Specification and/or Other Applicable Specification:

RTCA DO-160D

Manufacturer: **Northern Airborne Technology Ltd.**

Address: **#14 - 1925 Kirschner Rd., Kelowna, BC, Canada. V1Y 4N7**

Prepared By: DE 01	Checked By: NAT 209	Approved By: NAT 125

Conditions	DO-160D Section	Description of Conducted Tests
Temperature and Altitude	4.0	Equipment tested to Category B4
Low Temperature High Temperature	4.5.1 4.5.2 & 4.5.3	-30C Operating Low Temperature +55C Operating High Temperature +70C Short-term Operating High Temperature
Altitude	4.6.1	See Remark (2)
Temperature Variation	5.0	Equipment tested to Category B
Humidity	6.0	Equipment tested to Category A
Shock Operational Crash Safety	7.0 7.2 7.3	Equipment tested to Category B Test Procedure 1, Alternate Test Procedure (Impulse) Test Procedure 2 (Sustained), Unknown or Random orientation in aircraft.
Vibration	8.0	Equipment tested to categories SBM, UF
Explosion Proofness	9.0	Equipment identified as Category X no test required
Waterproofness	10.0	Equipment identified as Category X no test required

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Conditions	DO-160D Section	Description of Conducted Tests
Fluids Susceptibility	11.0	Equipment identified as Category X no test required
Sand and Dust	12.0	Equipment identified as Category X no test required
Fungus Resistance	13.0	Equipment identified as Category X no test required
Salt Spray	14.0	Equipment identified as Category X no test required
Magnetic Effect	15.0	Equipment is Class Z
Power input	16.0	Equipment tested to Category B
Voltage Spike	17.0	Equipment tested to Category A
Audio Frequency Susceptibility	18.0	Equipment tested to Category B
Induced Signal Susceptibility	19.0	Equipment tested to Category B
Radio Frequency Susceptibility	20.0	Equipment tested to Category TTX
Radio Frequency Emission	21.0	Equipment tested to Category M
Lightning Induced Transient Susceptibility	22.0	Equipment identified as Category X no test required
Lightning Direct Effects test	23.0	Equipment identified as Category X no test required
Icing	24.0	Equipment identified as Category X no test required
Electrostatic Discharge (ESD)	25.0	Equipment identified as Category X no test required

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REMARKS

(1) Tests were conducted at Northern Airborne Technology Ltd.

(2) AA21-401 was tested to 55,000 ft.

End of Environmental Qualification Form

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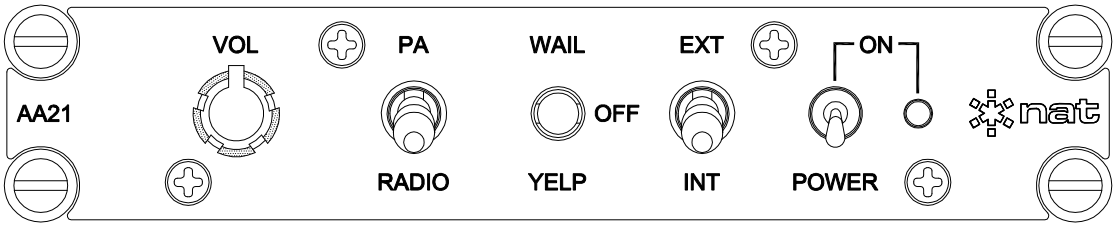
REVISIONS			
REV	DESCRIPTION	DATE	BY
1.10	DOCCR01643 – 'B' HOLE WAS 'G' HOLE, 'E' HOLES WERE 'A' HOLES, FORMAT CHANGES.	MAY 26/06	TAT



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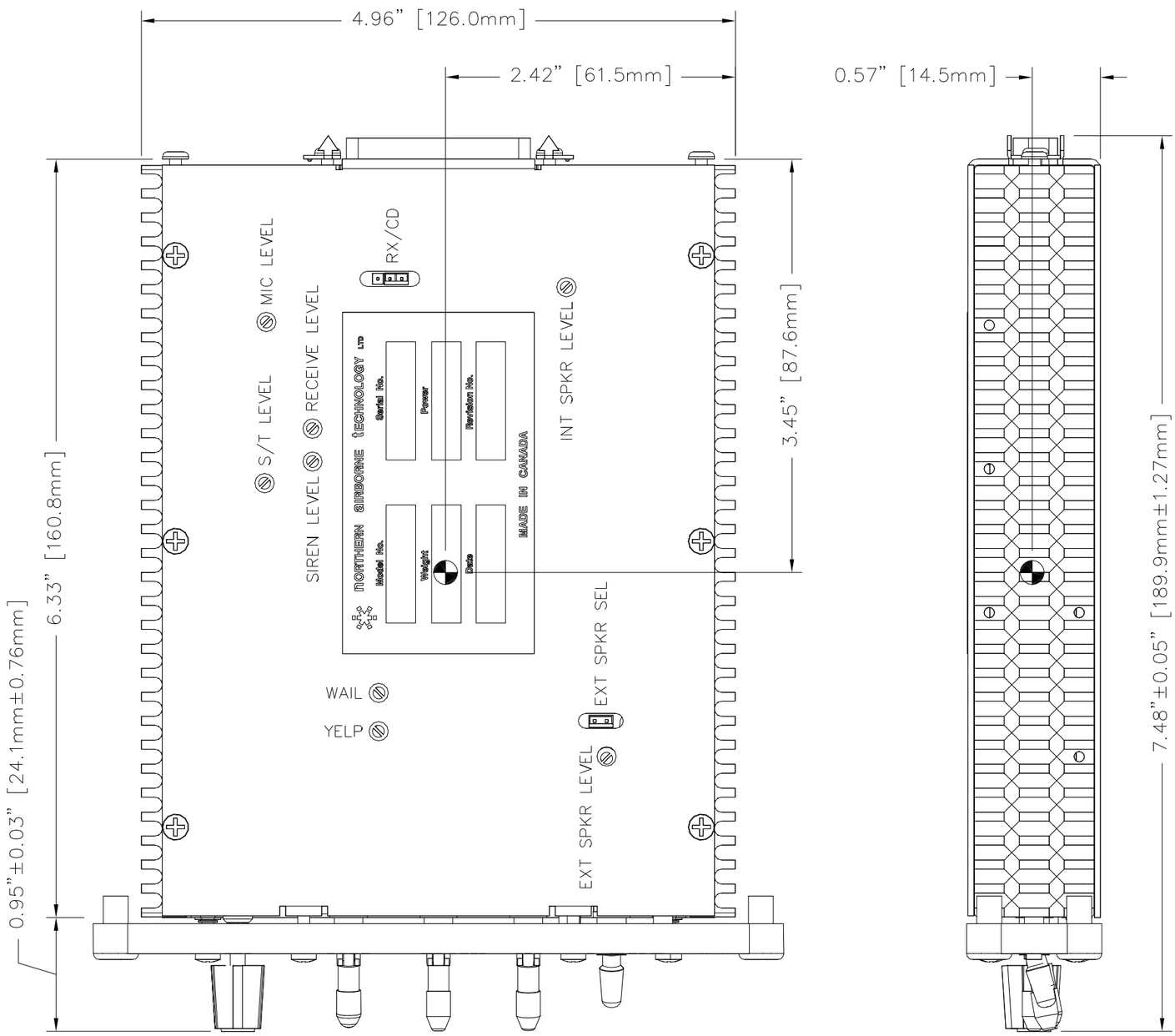
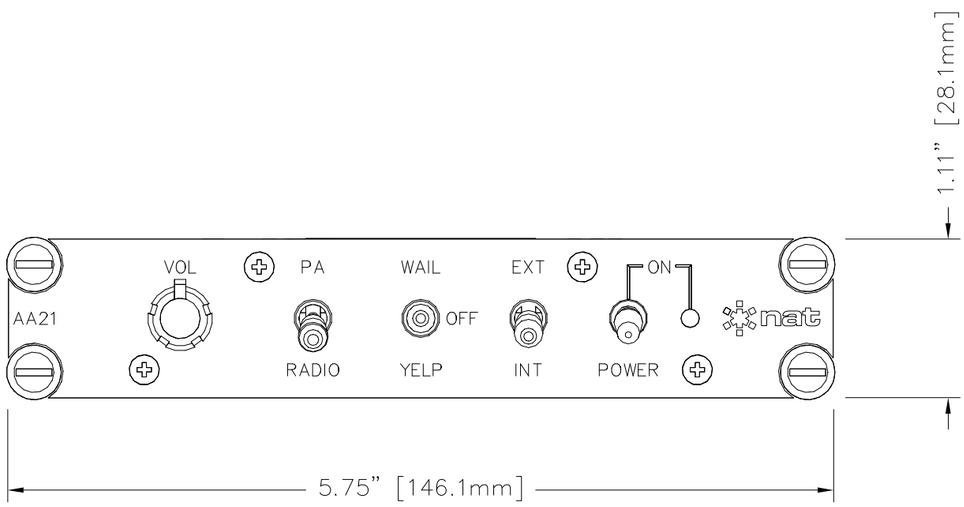
DESIGNED	RL	nat NORTHERN AIRBORNE TECHNOLOGY LTD.					
DRAWN	MWS						
DATE	JUL 30/99	TITLE					
CHECKED	NAT PROD 112 / NAT 255	PA CONTROLLER FRONT VIEW					
APPROVED	NAT 131	SIZE A	CAGE CODE 3AB01	PART NO. AA21–400		REV. 1.10	SHEET 1/3
FILE	905–0.DWG	DWG. TYPE	FACEPLATE	DWG. NO.	AA21\400\905–0		

ENG–FORM: \905's\AA21–4xx.905–0110.DWT





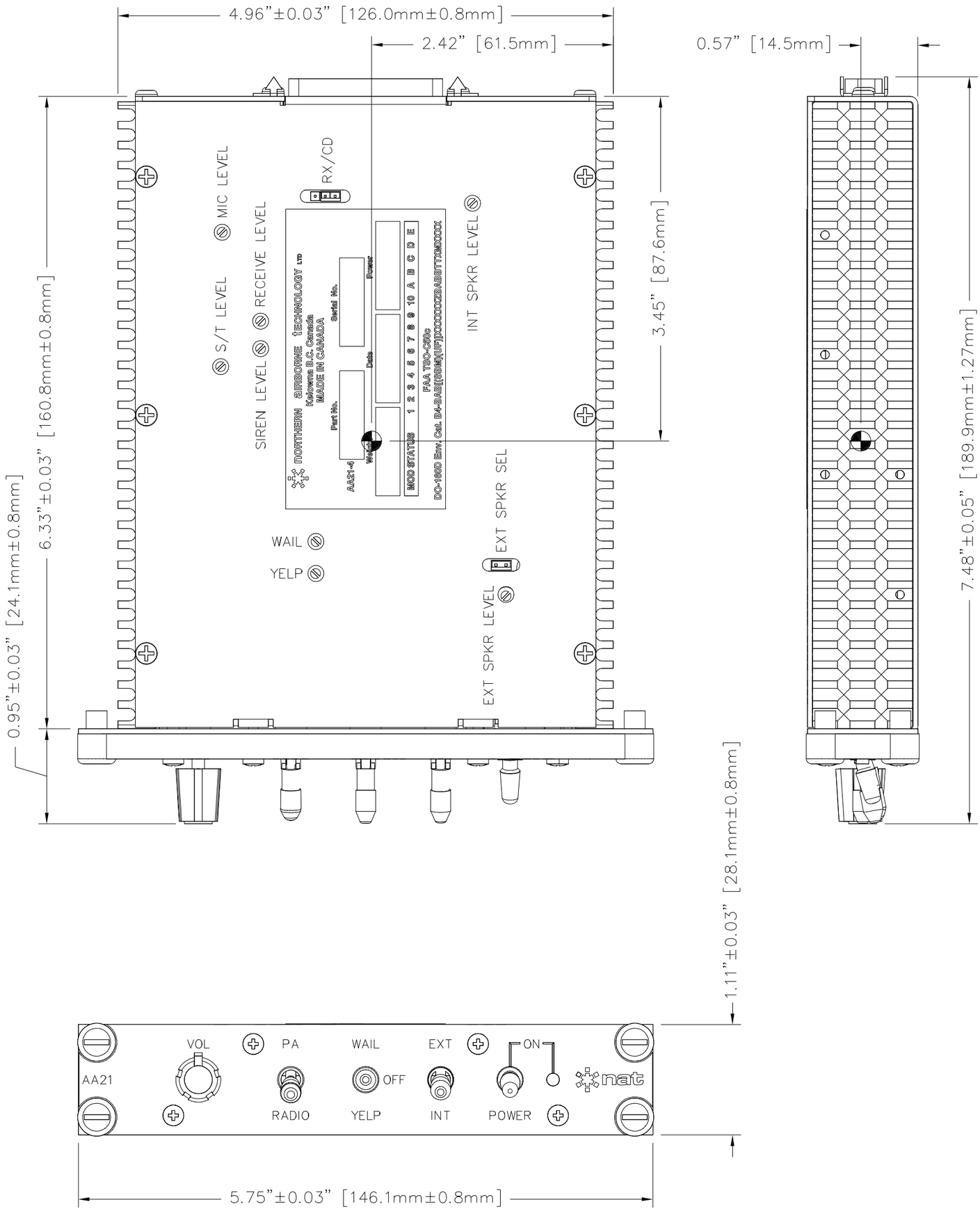
CENTER OF GRAVITY ±0.05

WEIGHT: 1.40 lbs. (0.64kg)

PROPRIETARY AND CONFIDENTIAL TO NAT LTD.

TOLERANCES UNLESS STATED OTHERWISE 0.X=+/−0.030 0.XX=+/−0.010 0.XXX=+/−0.005 0.XXXX=+/−0.002 ANGLE=+/− 0.5 DEG.	DIMENSIONS IN INCHES THIRD ANGLE PROJECTION	DESIGNED	SRK	nat NORTHERN AIRBORNE TECHNOLOGY LTD.			
		DRAWN	MWS				
		DATE	DEC 7/99	TITLE	CABIN PA SYSTEM		
		CHECKED	NAT NAT NAT 228 104 214				
MATERIAL		APPROVED	NAT 107	SIZE B	CAGE CODE 3AB01	PART NO. AA21−400	REV. 1.00	SHEET 1/1
FINISH		FILE 922−0100.DWG		DWG. TYPE MECH. INSTALLATION		DWG. NO. AA21\400\922−0	

REVISIONS			
REV	DESCRIPTION	DATE	BY
1.10	ECR #1556 – CHANGED TO TSO LABEL	DEC 16/99	MWS
1.11	ECR #1813 – ADDED 0.03" TOLERANCE TO DIM'S, ADDED TOLERANCE TO WEIGHT.	DEC 7/00	MWS



CENTER OF GRAVITY ±0.05

WEIGHT: 1.40 ±0.07lbs. (0.64 ±0.03kg)

PROPRIETARY AND CONFIDENTIAL TO NAT LTD.

TOLERANCES UNLESS STATED OTHERWISE 0.X=+/-0.030 0.XX=+/-0.010 0.XXX=+/-0.005 0.XXXX=+/-0.002 ANGLE=+/- 0.5 DEG.	DIMENSIONS IN INCHES THIRD ANGLE PROJECTION	DESIGNED	SRK	nat NORTHERN AIRBORNE TECHNOLOGY LTD.			
		DRAWN	MWS				
		DATE	DEC 7/99	TITLE	CABIN PA SYSTEM		
		CHECKED	NAT 228 / NAT 223				
MATERIAL		APPROVED	NAT 113	SIZE B	CAGE CODE 3AB01	PART NO. AA21-400	REV. 1.11 / SHEET 1/1
FINISH		FILE 922-0111.DWG		DWG. TYPE MECH. INSTALLATION		DWG. NO. AA21\400\922-0	

Section 3.0 Operation

3.1 Introduction

Information in this section consists of the functional and operational procedures for the AA21-400 Cabin PA system.

3.2 Operation Specifics

The AA21-400 Cabin PA system provides a central adjustment for internal and/or external aircraft paging functions. The AA21-400 is a self-contained amplifier that directly drives the cabin speaker(s) and/or the external PA system amplifier. When turned on, the system is ready for operation and will accept audio feeds or a microphone input. An internally generated siren is also available in WAIL or YELP modes. When the AA21-400 is turned on, a 28 Vdc switched signal is generated. This signal is used to turn on the PA amp relay (if connected in system). The high current DC power to operate the PA110/220 or PA250/700 is supplied by the aircraft.

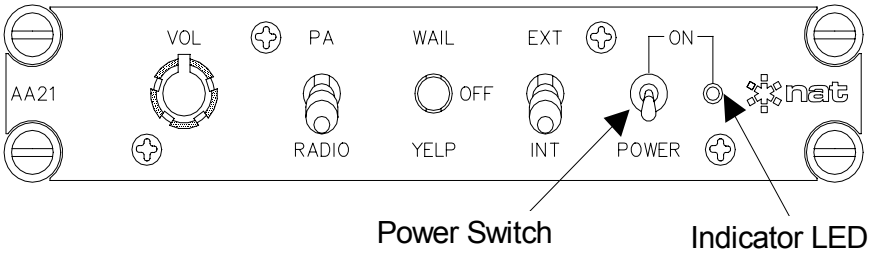
3.3 Techniques of Voice Transmission

To successfully project the human voice over long distances, it is necessary to develop a microphone technique different from the usual conversational manner. Place the microphone with the upper lip touching the mouthpiece and talk clearly and distinctly, with increased emphasis. Separate each word with noticeable pauses and keep the voice level constant. A medium pitched voice is more easily understood and carries farther than a bass voice.

3.4 Basic Operation

3.4.1 Power up

To activate the AA21-400 Cabin PA system, flip the POWER toggle switch up to the ON position. The LED adjacent to the switch should illuminate.



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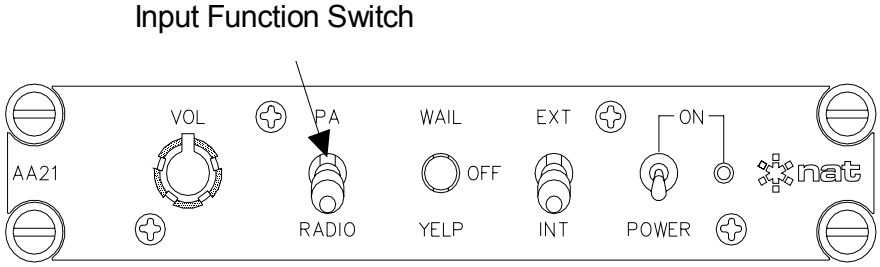
3.4.2 Input Function Selection

The Input Function switch is a two-position, locking switch on the front of the AA21-400 that is used to select between PA and Radio operation. When PA is selected, RADIO is disabled, and vice versa. It is good practice to set this switch to PA when operating the siren to avoid mixing incoming radio/CD audio with the siren audio output.



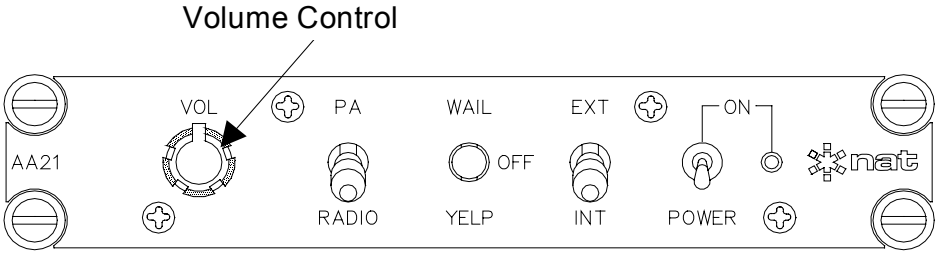
3.4.2.1 PA Operation

For external PA/Siren systems or internal paging functions, set the function switch on the AA21-400 to PA. Key the microphone through the cyclic or hand mic switch, and speak in a firm, clear manner.

3.4.2.2 Radio Operation

To set the system for radio rebroadcast functions, set the function switch on the AA21-400 to RADIO. All audio delivered from the source (typically pilot's or copilot's headset) will be broadcast from the PA system or internal speaker.

3.4.3 Volume Control



The volume control knob (**VOL**) on the front of the AA21-400 is used to adjust the level of the selected output. Rotating the knob cw will increase the volume, and ccw will decrease it. For external paging and rebroadcast operations, the volume should always be set between half and full level. The setting for internal paging must be determined by experiment to provide the desired coverage in the passenger area and to prevent feedback.

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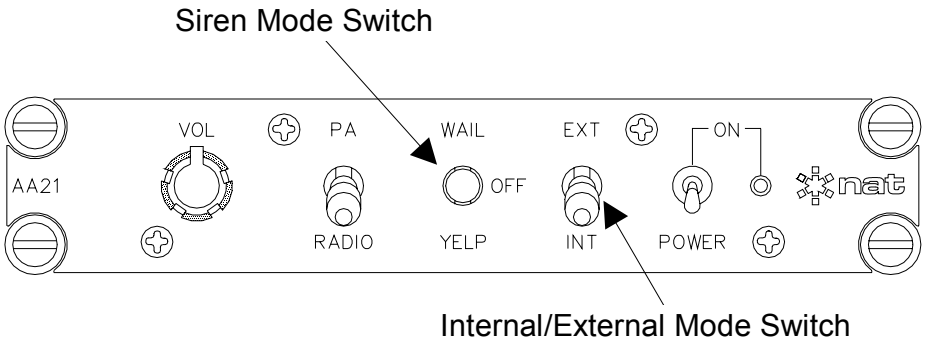
3.4.4 Mode Switches



3.4.4.1 Siren Mode

The siren mode switch is a three position, centre-off locking switch on the front of the AA21-400. The siren is operated by selecting the mode (**YELP** or **WAIL**) and then activating a remote Siren key. The siren will sound only as long as the mode is selected to WAIL or YELP and the Siren key is activated. It should be noted that in some installations, the remote Siren key is connected directly to ground. In this case, the siren will sound as soon as either YELP or WAIL is selected.

Note: Siren audio is only available when the **INT/EXT** switch is selected to **EXT**. (See section 3.4.4.2.)

3.4.4.2 Internal/External Mode Switch

The **INT/EXT** mode switch is a two position locking switch that routes the selected audio either to the internal 8Ω speaker (**INT**) or to the PA via an amplifier such as the NAT PA250/700 or PA110/220 (**EXT**).

3.4.5 Remote Power Switch

The AA21-400 provides a switched 28 Vdc low current output that is typically used to control the dc power circuit of an NAT PA110, PA220, PA250 or PA700.

Note: This output is only available when the power switch is in the ON position.

End of section 3.0

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